TRAUMATIC BRAIN INJURY: STRUCTURE, TACTICS OF OPERATIVE OPERATION (CLINICALLY-EXPERIMENTAL RESEARCH)

Pavlova T.V., Pavlova L.A., Bokova E.N., Pavlov I.A., Nemykin O.N., Nesterov A.V.
Belgorod State University
Belgorod, Russia

Traumatic brain injury (TBI) occurs in 30-35% of cases in the structure of traumatism. On its lot there are 75-80% of lethal terminations, and TBI is one of the most important reasons of disability of population. Last 2 centuries in Russia there is also observed the increase of number of cases of traumatism, particularly TBI. The prevalence of this phenomenon reaches 4 - 7,2 cases up to 1 000 of population in different regions [1]. Every year about the 70 thousands of adults and 17,6 thousands of children were considered to be invalids because of traumas of any localizations. While this in the general structure of traumatism to the part of abnormalities of CNS's functions it's a share of 30—40%, and in the structure of disability's reasons — 25—30% [2].

There were examined sick patients, who entered the neurosurgical department of municipal Belgorod clinical hospital №1 over 2004-2007 years inclusive. For the analysis of data were chosen medical carts of stationary sick patients with the serious form of TBI to whom there were giving an operative benefit. In the research there were taken laboratorial animals: rats of "Vistar" line (20 units), were separated on several groups: to the 15 of them there was carried out the resectional trepanation of skull in the right temporal region with the implantation of nanostructional titanic implant with the nanocrystalline hydroxylapatite coverage, and 5 of them were the control group (false operated). Histological preparation were tinctured with hematoxylin and eosin and were researched in the light microscope «TOPIS-T» CETI. Bone lamella were pulled out with the implant and without supplementary treatment were examined and photographed in the raster electronic microscope Quanta 200 3D. The examination of bone tissue were carried out through 7, 14, 21 days.

Through the examined period were chosen 189 medical reports, from which to the part of men it's a share of 158 (83,6%) humans, women - 31 (16,4%). Patience were carried out 3 types of operative intervention: resectional trepanation of skull – 146 cases (77,3%), bone-plastic trepanation of skull with the moving of bone flap - 8 (4,2%). The prevalence of resectional trepanation of skull is conditioned by indications to the decompression of brain, and also by the presence of traumatic defects of bones of calvarium (linear and pressed fractures that make the fulfillment of bone-plastic trepanation of skull impossible). The presence of postoperational defect leads not only to the cosmetic inferiority but also to the development of posttrepanational syndrome: cephalgia, meteorolability, hydrocephaly. The regress of all above-listed is observed after the restoration of skull's integrity. Therefore in the late postoperative period it's reasonable to carry out the plastic of bone defect. Thereby TBI holds its leadership between the injuries of other anatomico-physiological regions of body of humans. While this it has the huge socially-economic mean, because the majority of victims are reckoned among the capable of working population.

More currency is gain by the use of different materials for the implementation of plastic of posttrepanational defect [3,4]. Among the examined clinic cases in the capacity of materials for the cranioplasty were used osteobond - 10 (45,5%), titanium - 2 cases (9,0%) и autobone - 10 (45,5%).

It was revealed that operative treatment with the use of titanic implants with the calcium-phosphate covering from the nanocrystalline hydroxylapatite promotes better regeneration of bone tissue. While this there isn't observed the phenomenons of intoxication and development of nanopathology [5]. The use of innovative methods of allo transplantation makes possible the fast and aurtamatic the healing of bone structures. Adequate leading of postoperational period is necessary condition of favourable outcome of consequences of TBI. It is supposed in the sequel the use of implants from the recreated nanomaterials.

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The work was represented to the international science conference "Modern problems of experimental and clinical medicine", Thailand, February 20-28, 2010. Came to the editorial office on 30.01.2010.

EMBRYONIC DEVELOPMENT OF INFERIOR VENA CAVA

Petrenko V.M.
St.-Petersburg State Medical Academy named after I.I. Mechnikov
St.-Petersburg, Russia

Initiation of inferior vena cava (IVC) appears with embryo 5 mm length (4 weeks) as excrescence of vitelline- umbilicial trunk. It unites sinusoids of caudate lobe of liver. 6 week embryos' IVC includes right subcardinal vein. “Ascension” of growing kidneys at the 7th week into abdominal cavity is accompanied by fast pass of sacrocardinal and intersubcardinal anastomosis, mesocardinal veins – longitudinal vein anastomosis, connecting supracardinal (ascendant lumbar) and subcardinal veins, upper (paranephric) and lower (gonadal). Right parts of subcardinal and sacrocardinal sinuses, right lower mesocardinal vein compose IVC. Subcardinal sinus is devided into left renal vein (central part) and retroperitoneal lymphatic sac, sacrocardinal sinus – into left general iliac vein and subaortic sac. Left lower mesocardinal vein is switched off from the blood flow and turns into left lumbar trunks. Abdominal parts of posrcardinal veins are reducted, chest parts become azygos and hemiazygos veins. Chest subcardinal veins are switched off from the blood flow and turn into two thoracic ducts. Thus, IVC is formed in the sub-basin of posrcardinal veins involving hepatic sinusoids in the process of intensive growth of caudate lobe of liver, adrenals and kidneys, displacing mesonephros.

The work is presented for an International Science Conference “Contemporary problems of experimental and clinical medicine”, Thailand, February 20-28, 2010. Received by the editorship on 11.01.2010.

CONSTRUCTION OF HUMAN CARDIOVASCULAR SYSTEM

Petrenko V.M.
St.-Petersburg State Medical Academy named after I.I. Mechnikov
St.-Petersburg, Russia

Cardiovascular system is formed as closed circular system of blood vessels with anastomoses and collaterals including lymphatics which are many in peripheral vascular bed. Undirect anastomoses (semishunts) are “connected up” tissues: together they organize metabolism between blood and tissues. Peripheral vascular bed, especially microcirculatory bed (MCB), in functional plan is the hydraulic reductor – the construction for reduction of blood flow (lymphatic bed as supplementary to veins drainage of organs begins in micro-districts of MCB) and blood pressure to level when metabolism between blood and tissues can take place (frequent branching of arteriae and arteriolae) and for constant blood pressure is preserved in MCB (frequent and different anastomoses on different levels of MCB organization). From the point of view cardiovascular system consists of pump (heart) and reductor (microvessels in connection with tissues), between them conduits stretched – pressure (aorta and its branches, venae cavae and their roots – closed system of blood circulation together with heart and MCB) and unpressure (lymphatic bed). Lymphatic bed beginning from its roots in micro-districts of MCB plays role of venous collaterals and develops from it in phylogenesis and ontogenesis by means of reducing of connections with magistral vascular bed (pressure conduit) on gradient of blood pressure. In result lymphatic bed unloads venous bed by means of accumulation of surplus tissue fluid as lymph including large particles and cells which cannot penetrate through thickenning walls of venous capillaries. Their basal membrane cuts off lymphatic collaterals.

The work was submitted to international scientific conference «Prospects for the development of university science» (Sochi), September 22-25, 2010, came to the editorial office on 05.06.2010.

DEVELOPMENT OF CELL BIOMATRITS BASED ON HYALURONIC ACID

Rakhmatullina L.R., Barysheva E.S., Rahmatullin R.R.
Orenburg State University
Orenburg, Russia

Nowadays there a lot of researches of different organic and inorganic materials are done for the purpose of creating biocompatible matrices, at the base of which cells can be cultivate and transplant (including stem cells). The sphere of use of such materials is rather wide: implants of vitals; transplantation of cells; transdermal or implant systems with the controlled yield of bioactive substances. One of the key problems of creating of bioartificial organs and tissues is development of biodegrade three-dimensional matrices (bearers) for cells at the base of different chemical-biological complexes.

In the capacity of matrix materials there were researched a whole number of synthetic polymers [Robert Lanza,1997], such are polydiaxonones, polylactides, polyglicilids [Spychkyna O.G.,2006; Shved U.A.,2006]; polyethers of bacteriological origin (polymer β-hydrohybutyric acid (polyoxibutyrate, POB), polymer of oxioctanoic acid and two-component copolymer of β-oxi-butyrate and β-oxivalerate (POB-co-POV) [Volova T.G.,2003]. But metabolization of these polymers leads to the formation of acids, which lower cell survival.

Use of natural polysaccharides (chitin and its derivative chitosan) in the capacity of biomatrices in cell technologies demonstrated its low effectiveness.

The most optimal base of cell biomatrix by the dates of many researchers is biopolymer – hyaluronic acid (HUA) [Brown T.J. et al.,1999; Burg KJL et al., 2000; Greco R.M. et al.,1998; Jia C. et al.,1998; Kuzuya M. et al.,2006; Livesey S. et al.,2004].

Hyaluronic acid, briefly (HUA) is long linear polysaccharide, which consists of repetitive disaccharide units N-acetyl-D-glucosamine and D-glucuronic asid. HUA has unique rheological qualities that allow polymer to make viscoelastic gel while its low concentrations. These physicochemical qualities with the biological compatibility and not immune origin of